

Supplemental Information- Water Quality

Appeal No. A-6-NOC-11-086

City of San Diego

Coastal Development Permit

Master Storm Water System Maintenance Program

October 2, 2012



Executive Summary

The City of San Diego (City) Transportation & Storm Water Department is responsible for storm water management within City limits. The Master Storm Water System Maintenance Program is designed to integrate operation and maintenance planning, implementation, and assessment activities with water quality protection programs. This Supplemental Information submittal identifies the City's approach to watershed and site-specific water quality improvement activities aimed at reducing water quality impacts associated with maintenance activities and the need to provide flood control within the California Coastal Commission's jurisdiction.

The City conducts a multi-faceted urban runoff program with a tiered Best Management Practice (BMP) approach to efficiently and cost-effectively implement water quality improvement activities. The tiered BMPs include: pollution prevention, source control, and treatment and special study activities. The City has assessed the current inventory of water quality BMPs in the watershed areas draining to the three proposed priority channel maintenance areas within the coastal zone. At the request of Coastal Commission staff, the City proposes to implement a suite of key program enhancements that provide a water quality benefit associated with the proposed channel maintenance activities, which are identified in Table ES-1.

This document presents a summary of the City's programmatic findings and proposes specific water quality improvement activities within the coastal zone to address potential effects associated with channel operation and maintenance. The City anticipates that the suite of water quality mitigation described in this document can be adapted to meet long-term water quality objectives throughout this reiterative process in future permit cycles under the Master Maintenance Program.

Supplemental Information - Water Quality Submittal (October 2012)

City of San Diego Master Storm Water System Maintenance Program

Table ES-1. Proposed Water Quality Improvement Activities in Priority Channel Areas.

Number	Priority Channel Area Drainage	Water Quality Activity Type	Description	Implementation Frequency	Duration
1	Los Peñasquitos	Pollution Prevention	Commercial and residential property sediment reduction outreach distribution.	250 parcels	Approximately one month prior to maintenance initiation.
2		Source Control	Street sweeping improvements- targeted vacuum-assisted/regenerative air machine usage.	19.4 curb miles	One year subsequent to sediment removal maintenance events.
3		Source Control	Street sweeping improvements- targeted median sweeping route addition.	10.8 curb miles	
4		Treatment	Enhanced catch basin inspection and as-needed cleaning implementation.	25 inlet locations	
5	Mission Bay	Pollution Prevention	Commercial and residential property sediment reduction outreach distribution.	152 parcels	Approximately one month prior to maintenance initiation.
6		Source Control	Street sweeping improvements- targeted vacuum-assisted/regenerative air machine usage.	1.0 curb miles	One year subsequent to sediment removal maintenance events.
7		Source Control	Street sweeping improvements- targeted median sweeping route addition.	0.9 curb miles	
8		Treatment ¹	Enhanced catch basin inspection and as-needed cleaning implementation.	10 inlet locations	
9	Tijuana River	Pollution Prevention	Commercial and residential property sediment reduction outreach distribution.	250 parcels	Approximately one month prior to maintenance initiation.
10		Source Control	Street sweeping improvements- targeted vacuum-assisted/regenerative air machine usage.	5.0 curb miles	One year subsequent to sediment removal maintenance events.
11		Source Control	Municipal and bi-national agency collaboration through Tijuana River Valley Recovery Team to address sediment and trash.	Ongoing	Coastal Development Permit term.
12		Treatment	Enhanced catch basin inspection and as-needed cleaning implementation.	10 inlet locations	One year subsequent to sediment removal maintenance events.
13	Los Peñasquitos/ Mission Bay/ Tijuana River	Special Study	Evaluate the need and potential effectiveness of implementing slope stabilization measures and small scale water quality basin BMPs on City-owned parcels within the priority channel drainage areas.	To be determined	One year subsequent to sediment removal maintenance event for each priority channel segment.
14	Los Peñasquitos/ Mission Bay/ Tijuana River	Special Study	Degraded canyon area municipal separate storm sewer (MS4) outfall evaluation and improvement process.	To be determined	One year subsequent to sediment removal maintenance event for one priority channel segment
15	Los Peñasquitos/ Mission Bay/ or Tijuana River	Pilot Implementation Study	Conduct repairs on a prioritized representative degraded outfall to determine the relative level of planning, engineering and implementation effort needed to address identified canyon-area outfall problems.	1 outfall location	Coastal Development Permit term.

¹ A dry weather diversion is located at the downstream end of the Mission Bay High School and Pacific Beach Drive/Olney Street Channels. The diversion treats 100% of the dry weather runoff by diverting it to the sanitary sewer system.

Introduction

The City of San Diego (City) Transportation & Storm Water Department is responsible for storm water management within City limits. Responsibilities include: maintaining drainage infrastructure, compliance with water quality regulations, and enforcement of municipal code and ordinances. Like many municipal entities, the City is faced with aging infrastructure and limited budget and resources. Regardless of these resource limitations, the City is obligated to reduce flood risk and protect public and private property by maintaining the design capacity through efficient operation and maintenance of drainage infrastructure.

The City has developed the Master Storm Water System Maintenance Program (Master Maintenance Program) to optimize its business processes and practices related to channel operation and maintenance activities. The Master Maintenance Program is intended to integrate operational and maintenance planning, implementation and assessment activities with its water quality protection programs. This document provides a representative summary of the current activities the City conducts within its jurisdiction to improve water quality and an assessment of additional activities that the City proposes to implement to mitigate for potential water quality impacts associated with channel operation and maintenance in the coastal zone.

Managing Storm Water Systems in the City San Diego

The City manages a large Municipal Separate Storm Sewer System (MS4) which conveys storm water runoff from natural and developed areas to receiving waters such as lakes, river, creeks, streams, lagoons, and the Pacific Ocean. The City’s MS4 system is an inter-connected system of natural drainages and constructed drains, pipes, and channels. Collectively, the MS4 functions to convey drainage flows from impervious surfaces to receiving waters in order to protect the life and property of the City’s citizens from potential flooding.

City of San Diego Storm Drain System Features
<ul style="list-style-type: none">• Drains over 213,000 acres• Distributed throughout six watershed areas• 70,000+ storm drain assets• 900+ miles of storm drain pipe• 84+ miles of drainage channels

Storm water discharges from MS4s in urbanized areas are a concern because of the high concentration of pollutants found in urban runoff. Pollutants from human activities settle on impervious surfaces until precipitation events wash them into nearby storm drains. Common pollutants include metals, pesticides, fertilizers, bacteria, litter, and sediment. Storm water runoff picks up and transports these pollutants, non-native vegetation, and other components then discharges them to waterways via the MS4. In some cases, portions of the MS4 and/or waterways can accumulate sediment and debris that reduce flood conveyance capacity and increase flood risk for adjacent public or private infrastructure. The City’s

Supplemental Information - Water Quality Submittal (October 2012)

City of San Diego Master Storm Water System Maintenance Program

MS4 discharges are regulated under a National Pollutant Discharge Elimination System (NPDES) permit.

The City is responsible for NPDES program compliance and management; as well as, the operation and maintenance of City drainage and flood control systems. This dual responsibility requires the City to optimize the use of fiscal and other resources to integrate municipal flood control and storm water quality management. The City has formally defined the linkage of its flood control and water quality protection programs through its mission statement, core values and five overall goals.

City of San Diego Transportation & Storm Water Department Mission Statement:

“To protect and improve water quality and to reduce flood risk through efficient storm water management.”

Master Maintenance Program

The purpose of the Master Maintenance Program is to incorporate an integrated approach to maintenance by balancing the need to restore channel conveyance capacity for flood control and public safety with strategies to protect water quality and biological resources. The Master Maintenance Program also identifies the process by which the City intends to identify maintenance needs, prioritize channels for maintenance, analyze alternatives, minimize impacts, conduct technical assessments necessary to determine the appropriate mitigation, and perform and report on maintenance activities. These processes will provide resource agencies (including the California Coastal Commission), watershed stakeholders, and other interested parties the tools to evaluate the purpose, methods and mitigation proposed for channels with maintenance needs.

Pollution Prevention Links to the Master Maintenance Program

In response to NPDES permit obligations and as a result of integrated flood control drivers, the City has engaged in a multi-faceted urban runoff management program in the various watersheds within its jurisdiction. The City’s water quality protection program is based on an integrated and tiered Best Management Practice (BMP) approach. Three BMP tiers are defined with the goal of maximizing the effectiveness of BMPs to reduce pollutants and sediment loads and guide implementation strategies. Over time, these activities may also

City of San Diego Tiered BMPs
Tier I BMPs Non-structural source control and pollution prevention activities.
Tier II BMPS Structural BMPs such as infiltration basins and LID techniques to reduce runoff volumes and pollutant loads. Pilot studies to increase BMP effectiveness/ application are also included in Tier II.
Tier III BMPs Infrastructure-intensive structural pollution reduction treatment measures.

lead to reduced maintenance needs in downstream channel areas as sediment sources and other pollutants are reduced and/or eliminated in the upstream watershed.

The application of the City's tiered and integrated BMP approach has potentially significant long-term impacts to the Master Maintenance Program. Source control and pollution prevention activities will reduce supply of sediment and deleterious inputs to natural and constructed channel segments. The implementation of Low Impact Development (LID) practices and other structural BMPs will treat storm water runoff, slow velocities, and lessen flows of sediment-laden water to receiving waters. Finally, the combined effect of these activities, joined with associated outreach and improvements in public awareness is anticipated to lead to long-term improvements in the quality of runoff transported through the City's MS4. This will reduce the need for downstream channel clearing activities to increase channel capacity and reduce flood risk.

Programmatic BMP Inventory Overview

The City's multi-faceted urban runoff management program includes: education and outreach activities through the Think Blue program; implementation of Tier I, II, and III BMPs; inspection and enforcement activities; coordination with watershed stakeholders; and many other activities designed to reduce pollutant sources and treat urban runoff.

These activities may reduce the frequency and extent of impacts for channel maintenance over time. Any reductions in maintenance needs resulting from the City's general city-wide programmatic and LID programs would be captured by the annual hydrology studies, and channel maintenance activities would be adjusted accordingly. The projects below provide a representative sample of the suite of general water quality improvement projects that the City engages in throughout its jurisdiction, both in and outside of the coastal zone; as well as specific projects in the Peñasquitos, Mission Bay/La Jolla, and Tijuana River watersheds (Figures 1 and 2).

Wetland Mitigation

The Master Maintenance Program's Programmatic Environmental Impact Report (PEIR) identifies wetland mitigation implementation that is designed to offset not only biological impacts but also potential water quality and other impacts associated with wetland habitat values, functions and services. Mitigation for wetland impacts will be implemented in the form of wetland creation/establishment and wetland enhancement within the same watershed as the impacts but, in some cases, offsite. The mitigation ratios applied to the Master Maintenance Program include accounting for habitat, water quality, and other impacts. In general, these processes work to improve water quality by cycling of nutrients; removal of elements or compounds; retention of particulates; export of organic carbon; and/or maintenance of plant and animal communities (USACOE South Pacific Division, Standard Operations Procedure for Determination of Mitigation Ratios, 2012).

Low Impact Development Program

The City requires all new development and redevelopment activities to comply with storm water pollution prevention requirements that are outlined in the City's Storm Water Standards Manual and Low Impact Development (LID) Design Guide. The City's current LID program incorporates both Tier I and II activities and requires new development and redevelopment projects, with limited exceptions, to: 1) implement standard LID practices that include optimizing site layout to reduce the need for grading; 2) minimize the footprint of impervious surfaces such as paving and roofs; 3) disperse runoff to landscaped areas; and, 4) provide buffer zones around natural water bodies so that bioretention areas and other LID facilities can be located there. Larger priority development projects are required to implement additional LID measures to retain, reuse, or promote evapotranspiration of storm water, including retention and detention systems, use of biofilters and pervious surfaces, landscaping design, minimizing soil compaction, and use of cisterns or rain barrels. The City has required these LID measures for applicable projects since March 2008.

Supplemental Information - Water Quality Submittal (October 2012)

City of San Diego Master Storm Water System Maintenance Program

Examples of LID implementation in the City include two projects in the Los Peñasquitos watershed. At the Mira Mesa Library, the City has initiated a capital improvement project designed to allow storm water filtration and infiltration through a pervious pavement BMP in the library parking lot. The City has also initiated a capital improvement project designed to implement a hydrodynamic separator BMP in a residential street environment at Marindustry Street to remove trash, sediment, and other pollutants from storm water prior to an MS4 discharge into a canyon area. These types of projects will reduce sediment loads in the City's storm water and ultimately lead to a reduced need for maintenance in downstream channel areas.

Additionally, the City recently audited its codes, ordinances, policies, and regulations to identify barriers to the implementation of these LID storm water management measures. This audit identified several efficiency improvements in its regulatory support for water quality protection best management practices and LID implementation projects that are being pursued.

Watershed Asset Management Plans

The City is currently in the development phase of Watershed Asset Management Plans (WAMPs) for each watershed within the City's jurisdiction. A WAMP is a planning document, updated annually, that develops the projects, tasks, actions, program elements, and levels of investment needed to manage the watershed's assets to meet City-identified levels of service. These plans will provide a vehicle to identify and prioritize potential water quality and flood control challenges; evaluate opportunities for integrating water quality and flood control management into City projects, and operations and maintenance activities within the watershed; and provide a vehicle for public participation.

Comprehensive Load Reduction Plan Development

The City recently completed collaborating with other named Responsible Parties for the *Revised Total Maximum Daily Loads for Indicator Bacteria, Project 1 – Twenty Beaches and Creeks in the San Diego Region* (Bacteria TMDL) to jointly prepare a Comprehensive Load Reduction Plan (CLRP) in fiscal year 2012. The CLRP outlined the BMPs needed to achieve bacteria load reductions from each Responsible Parties' MS4. Included as part of this project are a suite of recommended nonstructural and structural BMPs selected based on their applicability to specific pollutants, impairments and conditions in the watershed(s), specific land use conditions, and suitability and availability of land for implementation in the target watersheds.

In fiscal year 2013, the Responsible Parties have agreed to cooperatively develop an update to the CLRP that will use computer modeling to provide greater detail regarding the number, location, and type of BMPs that will be needed to achieve the bacteria reductions, and address other pollutants within the watershed. A number of projects identified in the CLRPs are directly applicable to reducing sediment and other pollutants entering the MS4 and will lead to improved water quality in channel segments throughout the City's jurisdiction.

Think Blue Public Pollution Prevention Program

Think Blue is the City of San Diego's storm water pollution prevention campaign that aims to educate residents, businesses, and industry leaders about the effects of storm water pollution and how to prevent that pollution from harming our environment. Exemplary projects attributed to Think Blue include the following:

- Project Swell (a partnership between the City, San Diego Unified School District and San Diego Coastkeeper) to enhance existing science curricula to better address pressing environmental issues related to local watersheds;
- Initiation of a Think Blue booth to answer questions and provide educational outreach materials to Mission Bay park visitors, RV-users, and boaters during the summer months; and,
- Development and implementation of numerous public education and outreach multi-media campaigns and materials.

These and other Think Blue efforts are important components in reducing sediment and other pollutants entering the MS4 and will lead to improved water quality in channel segments throughout the City's jurisdiction.

Street Sweeping Pilot Studies

The City is currently in the fifth phase of a series of pilot projects to evaluate potential water quality benefits of various optimization techniques that may be applied to its current street sweeping efforts. Each pilot program phase is designed either to assess specific Tier II modifications to current street sweeping practices, or to determine the relative pollutant removal efficiency of specific sweeper technologies and/or sweeping techniques. The intent of this work is to improve pollutant removal (including sediment) from urbanized areas prior to entering the City's MS4 and moving to receiving waters. A number of the pilot study routes were located in the Los Peñasquitos watershed.

Canyon Area Outfall Asset Assessment

The City has identified a need to assess canyon areas where MS4 asset structural or configuration issues have the potential to cause or contribute to downstream water quality problems, such as sediment loads. Accordingly, the City has developed and implemented a prioritized assessment strategy for canyon outfall assets to identify areas where assets may need to be rehabilitated or replaced to prevent structural damage, reduce or eliminate potential erosion issues and/or improve water quality in downstream receiving waters. These assessments will lead to Tier II-type improvements of the City's MS4 outfalls. In addition, this work is consistent with the City's CLRPs.

The City is currently implementing the fourth phase of this work, and to date visited over 1,500 of the estimated 11,000 canyon area outfalls throughout its jurisdiction. The most recent phase of this work was conducted exclusively in the Los Peñasquitos watershed.

Site-Specific BMP Inventory

A number of Tier I, II and III BMPs have been employed within areas that interest both the City's jurisdiction and the coastal zone to address sediment and water quality pollutants (Figure 2). A brief description of a selection of the BMPs and water quality improvement projects located within the priority coastal maintenance areas of Sorrento Creek, Los Peñasquitos Creek, Soledad Creek, Flintkote, Mission Bay High School/Pacific Beach Drive/Olney Street, and Tijuana River Pilot/Smuggler's Gulch channels are presented below.

Mission Bay Treatment-Mission Bay Sewage Interceptor System Site I-8 (Dry Weather Flow Diversion)

In response to a series of sewer overflows and other non-point source pollution issues that resulted in degraded water quality in Mission Bay, the City has constructed an extensive network of diversion systems over the past 25 years. The Mission Bay Sewage Interceptor System (MBSIS) protects water quality by intercepting flow from the MS4 during non-rain event periods, and diverts it to the City's wastewater collection system. One of the MBSIS locations is located at the terminus of the Mission Bay High School/ Pacific Beach Drive/Olney Street channel immediately upstream of the discharge to Mission Bay. This BMP provides 100% treatment and water quality protection for dry weather flows transported and conveyed from the Mission Bay High School/Pacific Beach Drive/Olney Street channel.

Los Peñasquitos TMDL Development

The City recently completed participation in a three year watershed-based project to develop a Total Maximum Daily Load (TMDL) for sedimentation/siltation in Los Peñasquitos Lagoon (Lagoon). This Lagoon is identified to be an impaired waterbody on the Clean Water Act Section 303(d) list for sedimentation/siltation. The City and other stakeholders worked collaboratively to develop the Los Peñasquitos Lagoon Sedimentation TMDL to restore the most sensitive beneficial uses in the Lagoon. This project included collaboration with Responsible Parties and stakeholders to achieve consensus and carry a Basin Plan Amendment to the California Regional Water Quality Control Board (Regional Board) hearing supporting adoption for the first time in the San Diego Regional Board's history. The City solely funded the project and solicited the support of other stakeholders in the watershed.

Los Peñasquitos Treatment- Lagoon Mouth Opening

The City is currently in the final stages of approval for implementation of a project to assist in physically opening the Lagoon mouth to restore the tidal prism. Tidal flushing of the Lagoon during the summer months is necessary to allow inundation of oxygen-rich waters into the Lagoon and prevent fish kills. Under this collaborative program with the Los Peñasquitos Lagoon Foundation and State Parks, City equipment and operators will excavate and properly dispose of marine sediments from the inlet area and re-contour the area to mimic natural beach contours.

Los Peñasquitos Treatment- Desilting (Sediment) Basin

In cooperation with the Los Peñasquitos Lagoon Foundation, State Parks and the State Coastal Conservancy, the City assists with the management and maintenance of a desilting (sediment) basin located directly upstream from the Sorrento Valley area channels just east of the Interstate-5 and Interstate-805 merge. The basin was constructed with the intended objective to intercept sediment loads from the Los Peñasquitos Creek; thereby, reducing the sediment input into the Los Peñasquitos Lagoon. The regulatory permitting, maintenance and monitoring efforts are shared through a cooperative monitoring and maintenance agreement between the Los Peñasquitos Foundation and the City. Specifically, the City is responsible to dredge and dispose of any sediment, debris and trash accumulated in the basin to maintain its hydraulic capacity and helps restore the Lagoon.

Tijuana River Valley Restoration Project - SWRCB-Funded Grant

The City is helping to lead the Tijuana River Valley Recovery Team's (Recovery Team) efforts to address sediment and trash pollutants impacting the sensitive habitat, biological, cultural and recreational resources in the Tijuana River Valley (Note: this project is not displayed on Figure 2). The Recovery Team is a collaboration of more than 30 federal, state and local agencies and other interested parties from both sides of the border focused on addressing sediment, trash, and associated environmental issues. The City has taken a leadership role in the collaborative stakeholder-led approach to integrate the diverse scientific, environmental, regulatory and private stakeholder perspectives with existing planning documents. The result of this effort was the creation of the Tijuana River Valley Recovery Strategy (Recovery Strategy) document. The Recovery Strategy identifies a series of Tier I, II, and III-type BMP activities on both sides of the U.S./Mexico international border to reduce the impacts of anthropogenic sediment and trash on the Valley's resources and reduce the need for the City's channel maintenance activities.

Proposed Master Maintenance Program Water Quality Improvement Activities

The City proposes to utilize a suite of pollution prevention, source control, special pilot study/process improvement, and treatment BMPs to address sediment and other pollutant inputs to priority channel area drainages within the coastal zone. The selected activity suite was derived from evaluation of current water quality improvement activities in each drainage area, and synthesis of City programmatic findings. The proposed activity suite is both representative of the City's overall tiered and integrated BMP approach, as well as designed to reduce sediment and other pollutant loads from entering the priority channel areas. The City anticipates that application of these activities with the priority channel drainage areas will mitigate for potential water quality impacts associated with proposed maintenance activities during this permit cycle and lead to long-term water quality benefits.

Pollution Prevention - Commercial and Residential Sediment Reduction Outreach

The City's Think Blue program provides a proven education and outreach program that works with communities across each of the watersheds within City jurisdiction. Think Blue creates awareness and instigates changes in behavior that address water quality improvement needs. As part of the Master Maintenance Program, the City proposes to develop and distribute targeted outreach materials for residential, commercial, and rural/agricultural properties within the priority coastal zone maintenance areas. Distribution of these materials will be in addition to the robust schedule of radio, television, and movie theater advertising used to support the City's the successful and ongoing Think Blue pollution prevention campaign and address pollutants. City staff also regularly meets with property owners and other stakeholders throughout the City area. These regular meetings support not only the City's storm water pollution prevention measures but also environmentally sensitive habitat protection measures, agricultural best management practices, and other applicable topics. It is the City's intent to continue regular meetings with stakeholders to present new written materials supporting pollution reduction efforts that will reduce sediment and other pollutant loads from entering the priority channel areas.

Targeted outreach material will be developed for residential, commercial, and rural/agricultural properties within the priority channel drainage areas. The distributed material will cover appropriate best management practices tailored to the property land use as it relates to storm water pollution prevention of sediment, common urban pollutants, and agricultural-related waste products. Where appropriate, the distributed material will be printed in both English and Spanish. The targeted material will be distributed to up to 250 properties within each priority channel drainage area approximately one month prior to each scheduled maintenance activity. Material will be distributed to a total of 652 properties in the coastal zone adjacent to the priority channels in the Sorrento Creek, Mission Bay, and Tijuana River areas (Figures 3-5; Table 1).

Table 1. Summary of Targeted Commercial, Residential, and Agricultural Land Use Sediment Reduction Outreach Activities

Channel Area	Number of Targeted Properties
Sorrento	250
Mission Bay	152
Tijuana River	250
Total	652

Source Control - Enhanced Street Sweeping

Currently, the City street sweeping program encompasses approximately 2,500 miles of street surface within City jurisdiction. In general, the City sweeps residential areas on a monthly basis and commercial areas on a weekly frequency. These frequencies translate to approximately 36,000 and 45,000 curb miles of street sweeping for residential and commercial areas annually, respectively. The culmination of this effort leads to annual average removal of over 20,000 cubic yards of material (weighing more than 5,000 tons) from impervious street surfaces within City jurisdiction.

The City’s Street Sweeping Pilot Study Phase I data indicated that on relatively flat routes, vacuum-assisted/regenerative air sweeping machines can be up to approximately 33% more efficient in weight of debris collected per broom mile swept. The second phase of the Street Sweeping Pilot Studies have shown that increasing sweeping frequency to twice per week has limited effectiveness for the more common mechanical sweepers in the City’s fleet. While increased sweeping frequency (twice weekly) using vacuum-assisted/regenerative air machines has been shown to provide similar debris removal rates per broom mile swept compared to once per week sweeping, increased bi-weekly sweeping presents significant logistical challenges for managing the City’s limited sweeping resources. The third phase of the City’s Street Sweeping Pilot Studies indicated that a substantial pollutant removal benefit could be gained from sweeping median street areas that are not subject to regular street sweeping routes. Specifically, the initial sweeping event in median areas collected over three times the average of weight of material per broom mile using mechanical sweepers on typical curb and gutter areas. The Phase III data also suggested an optimum sweeping frequency for median areas that considers pollutant and debris build-up rates and City operational capacity constraints is quarterly sweeping events.

The City proposes a two-fold approach to using enhanced street sweeping as a source control activity to reduce sediment and other pollutants from impervious surfaces prior to wash-off into the priority channel areas. First, the City intends to prioritize sweeping of several high-traffic commercial routes in the coastal zone adjacent to the priority channel areas utilizing its limited vacuum-assisted/regenerative air fleet on a weekly basis (Figures 6-8). Second, the City proposes to sweep select median areas within each priority channel drainage area on a quarterly basis. The identified sweeping machine enhancement on select commercial routes and additional quarterly median sweeping will be will be conducted in the

Supplemental Information - Water Quality Submittal (October 2012)

City of San Diego Master Storm Water System Maintenance Program

priority channel drainage area for one calendar year subsequent to each maintenance event that requires sediment removal. Once the post-maintenance calendar year is complete, the City, at its option, may resume its regularly scheduled sweeping regime in the priority drainage area.

Enhanced sweeping source-control BMP will benefit water quality in the drainages leading to the priority channel areas by reducing pollutants loads entering into the specific channel and offset the temporal loss of potential water quality infiltration after maintenance. Sweeping enhancements will account for improved debris removal on a total of 25.4 curb miles using the vacuum-assisted/regenerative air machines and 11.7 curb miles of median areas within the coastal zone (Table 2). Enhanced sweeping of 25.4 curb miles on a weekly basis using vacuum-assisted/regenerative air enhanced machines could improve pollutant removal over 1,320 curb miles within the priority channel drainage areas on an annual basis. In addition, enhanced quarterly median sweeping could add 46.8 curb miles of previously un-swept area annually to the City’s integrated pollutant removal activities.

Table 2. Summary of Source Control- Enhanced Street Sweeping Activities

Channel Area	Sweeping Machine Enhancement Area (curb miles)	Median Sweeping Enhancement Area (curb miles)
Sorrento	19.4	10.8
Mission Bay	1.0	0.9
Tijuana River	5.0	-- ¹
Total	25.4	11.7

¹ Roadway configuration within the Tijuana River and Smugglers Gulch Channel drainage area within the coastal zone does not include sufficient median roadway area to provide appreciable pollutant removable benefit for enhanced median sweeping.

Treatment - Enhanced Catch Basin Inspection and As-needed Cleaning Implementation

It is widely recognized that treatment of sediment, trash and other pollutants in storm water runoff is a key mechanism to reduce sediment accumulation in channel areas. Further, the maintenance and management of the nearly 40,000 catch basin inlets in the City represents one of the most time-and resource intensive of the City’s many efforts to prevent pollutants from reaching receiving waters. Recently, the City performed a pilot study to assess the treatment efficacy and operation and maintenance requirements for six types of commercially-available catch basin insert products. Catch basin insert products are designed to reduce the level of trash, debris, and other pollutants from storm water through mechanical filter unit processes prior to runoff entry into the MS4 system. The City’s Catch Basin Insert Pilot Study data indicated that the tested products had limited treatment capacity during storm events, with a majority of the products overflowing/bypassing during the initial minutes of a monitored storm event.

Catch basins themselves may trap many different types of solids and chemicals that wash off the landscape, from fine particulates and leaves to gross pollutants, floatables and trash. Given the treatment

Supplemental Information - Water Quality Submittal (October 2012)

City of San Diego Master Storm Water System Maintenance Program

performance data for catch basin insert products, the City conducted a separate pilot study to assess the relative pollutant removal efficacy of enhanced catch basin inspection and cleaning. The Catch Basin Inlet Cleaning Pilot Study indicated that differences in land use types, drainage system ages and conditions, and the sensitivity of receiving waters, can impact pollution prevention efficacy of storm drain catch basin cleaning in different land use areas. The results of the Catch Basin Inlet Cleaning Pilot Study suggested the City’s current NPDES-regulated cleaning frequency of one annual cleaning per inlet may be modified to tailor to local conditions. The City currently anticipates that an approximately 5% increase in inspection of the City’s MS4 inlets will likely lead to improved debris removal. The increased inspections will be used to identify and clean inlets adjacent to the channel impact areas where surrounding land use and other factors are shown to cause increased debris accumulation. Within a month after each specific channel maintenance activity that requires sediment removal is initiated, the City proposes to increase the inspection frequency and cleaning by 5% in that priority drainage area for one calendar year. Furthermore, with each inspection, storm drain catch basins with significant accumulated debris will be cleaned to reduce sediment and pollutant loads in coastal waters (Figures 6-8) and mitigate removal of in-channel sediment and vegetation that can improve water quality. Since these three priority channels are within natural depositional areas in the lower reaches of the watershed, the City anticipates sediment and wetland vegetation will continue to accumulate after maintenance. Once the post-maintenance calendar year is complete, the City, at its option, may resume its regularly scheduled inlet inspection regime in the priority drainage area.

It is recognized that a 5% increase in inspection frequency in relatively small priority channel drainage areas with few catch basin inlets will result in only a minor increase in potential for identifying problem catch basins. Accordingly, the City proposes to increase inspection (and subsequent as-needed cleaning) frequency for one calendar year by 5% or up to 10 catch basin inlet locations per priority channel drainage area after maintenance is initiated where sediment removal is required. Increased catch basin inspection implementation will likely account for improved debris removal in a portion of the 45 MS4 inlets as described in Table 3.

Table 3. Summary of Treatment- Catch Basin Inspection and As-needed Cleaning Activities

Channel Area	Estimated Number of Catch Basins Within Drainage Area Within Coastal Zone	Number of Increased Catch Basin Inspections and As-needed Cleaning
Sorrento	505	25
Mission Bay	11	10
Tijuana River	149	10
Total	667	45

Source Control – Continued Tijuana River Valley Recovery Team Leadership and Participation

The City has been an active participant in the San Diego Regional Water Quality Control Board's Recovery Team process since its inception in 2008. Given the unique challenges in managing water quality in the bi-national Tijuana River watershed, this collaborative multi-agency and international approach is one of the few ways the City can proactively influence policy and implementation decisions that will have impact on the sediment and trash loads crossing the U.S./Mexico border, and deposited in the Smugglers Gulch and Pilot Channels.

The City supports the Recovery Team's mission "to bring together the governmental administrative, regulatory, and funding agencies in tandem with advice from the scientific community, the environmental community, and affected stakeholders to protect the Tijuana River Valley from future accumulations of trash and sediment, identify, remove, recycle or dispose of existing trash and sediment, and restore the Tijuana River floodplain to a balanced wetland ecosystem" through numerous planning and implementation actions. These activities include: coordination with Recovery Team stakeholders to promote appropriate sediment management practices (pollution prevention), financial and personnel support of manual trash pickup events in the Valley (source control) and planning and preliminary design of structural BMPs to treat sediment and trash in storm water flows (treatment). Because of numerous stakeholder involvement and physical limitations to implement BMP projects in this area, the City proposes to continue working closely with local, state and federal regulators and agencies, non-government organizations, and other stakeholders in the Recovery Team to implement appropriate BMP activities collaboratively. This includes continuation of cross-border engagement with agency representatives in Mexico to encourage pollution prevention, source control and structural BMP activities to treat the sediment and trash issues at the source. Representative examples of current and upcoming City-funded Recovery Team-related activities include: continued support and data collection oversight for WiLDCOAST (a local cross border non-profit organization) trash pickup programs, coordination with Mexican agencies in review of available hydrology and hydraulic reports detailing flow patterns and regimes in Mexico leading to potential sediment basin implementation, support of a collaborative regional sediment management plan that intends to identify cost-efficient re-use and disposal options for sediment excavated from the Tijuana River Valley. It is anticipated that over time, the Recovery Team's pollution prevention, source control, and treatment efforts will reduce sediment and trash accumulating within coastal waters and resources.

Special Study – Slope Stabilization and Small Scale Water Quality Basin BMP Evaluation

Slopes with anthropogenic-caused disturbance and other development with reduced stability in open space areas have potential to contribute to sediment and pollutant loading issues in watersheds served by the City’s MS4. The City proposes to conduct a special study to evaluate the need and potential effectiveness of implementing slope stabilization measures and small-scale water quality basin BMPs on City-owned parcels within the priority channel drainage areas (Figures 3-5; these figures indicate City-owned parcels within each priority channel drainage area). The special study will be conducted in priority drainage areas after maintenance where sediment removal is required within one calendar year after maintenance is initiated. The evaluation would include a desktop review of City owned properties for potential signs of erosion or other issues that may require a need to implement slope stabilization or other BMPs. Potentially suitable sites, as determined in the desktop survey, will be further investigated with a field visit by a certified specialist in sediment and erosion control. The results of the field visit will determine potential BMPs that may be employed to stabilize slopes and/or reduce sediment-laden runoff from the site. The focus of the special study will be on evaluating slope stabilization and water quality basin BMP options regarding their applicability to the site conditions, space and sizing requirements, environmental impacts and the resulting mitigations measures, maintenance procedures, and a cost-benefit review. The City will submit the results of this special study to Coastal Commission staff.

This evaluation will help the City decision-making process on employing the appropriate cost-effective BMP to areas with sediment impairment concerns and potentially help to identify additional water quality mitigation options for future Coastal Development Permits under the Master Maintenance Program.

Special Study/Process Improvement - Degraded Outfalls

Over the past three years, the City has been proactively visiting and assessing MS4 outfalls in canyon areas to evaluate the structural condition of the reinforced concrete, corrugated metal, and other material pipe assets (Figure 9). The majority of the assessed outfalls were designed prior to 1984 when design standards were not specifically detailed in storm water management controls. Since 1984, design standards have been significantly improved and are incorporated on new outfall construction or when major repairs are performed.

As part of the City’s MS4 outfall assessment work, the adjacent downstream channel condition, surrounding vegetation and a series of other physical parameters have also been evaluated. The result of this effort is a database of canyon area asset condition assessments that can be queried for various attributes such as presence of signs of active erosion downstream of the MS4 outfall, standing water and non-native vegetation. A number of degraded outfalls that appear to require maintenance, repair, or replacement to reduce potential erosion and/or other problems have also been identified (Figure 10).

A-6-NOC-11-086

Supplemental Information - Water Quality Submittal (October 2012)

City of San Diego Master Storm Water System Maintenance Program

During this permit cycle, the City proposes to implement a special study to develop a process and efficient procedure to handle specific maintenance, repair, and/or replacement needs for outfalls with sediment-related issues (Figure 11). This special study will focus on identifying a clear decision-making

process to assess needed repairs at the individual outfall level, initiating appropriate environmental permitting documents, and developing a process to implement and/or track the status of repair/replacement jobs. Within one-year after maintaining one of the three priority channels, the City will prepare this special study and submit the report to Coastal Commission staff. The City anticipates this preparatory study will identify a process to prioritize drainage-related Engineering & Capital Projects and/or other appropriate repair and replacement techniques that can reduce sediment and debris loads in coastal areas and will lead to improved water quality in channel segments with the coastal zone and throughout the City’s jurisdiction.

Special Study- Degraded Outfall Repair Pilot

The City’s proactive effort to assess the condition of outfall structures in canyon areas and identify outfalls with sufficient damage to either the structure or the downstream channel is the basis to allow for structural or other improvements to reduce sediment loads to priority channel and other areas. The proposed Special Study/Process Improvement - Degraded Outfalls work presented above intends to provide the City a prioritization process to cost-efficiently evaluate degraded outfalls, plan, design, and permit repair work. In conjunction with this study, the City proposes to implement one pilot outfall repair project in the coastal zone, within a five-year term as part of the Coastal Development Permit for the Los Peñasquitos, Mission Bay and Tijuana River priority channel areas.

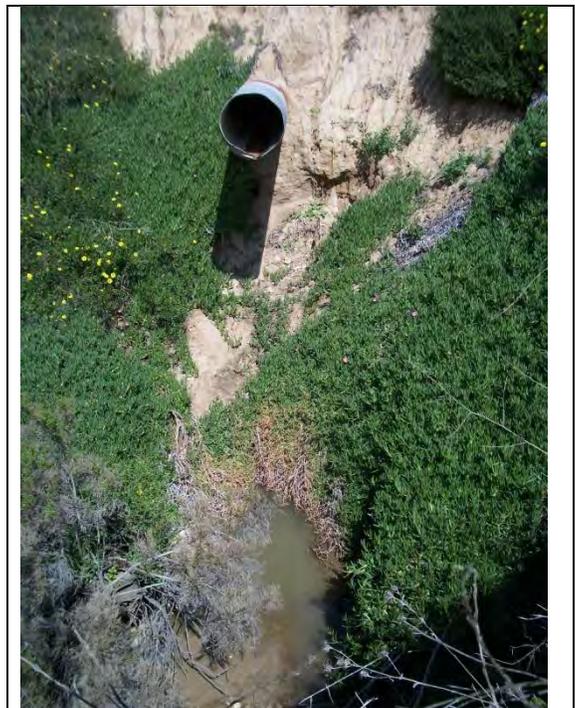


Figure 11. Example of Canyon Area Outfall in Need of Repair

Subsequent to the maintenance of any one of the three priority channels, the City will implement a repair project on a prioritized outfall.. The project will select a representative outfall in need of energy dissipation, repair and/or replacement and utilize existing City processes to budget, plan, engineer and conduct repairs to the selected outfall location. The duration, level of effort, cost and lessons learned from each component of the repair project will be documented in order to allow efficient future implementation of additional outfall repairs. Prior to the permit expiration date, the City will provide a brief technical memorandum documenting the degraded outfall repair process for use in internal and external communication with stakeholders in the Master Maintenance Program process.